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No. 1362

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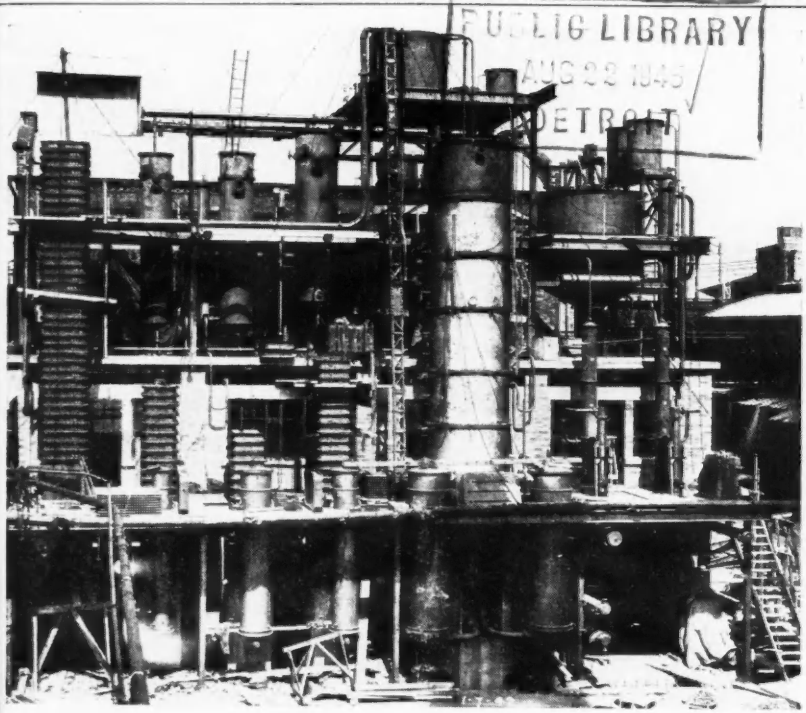

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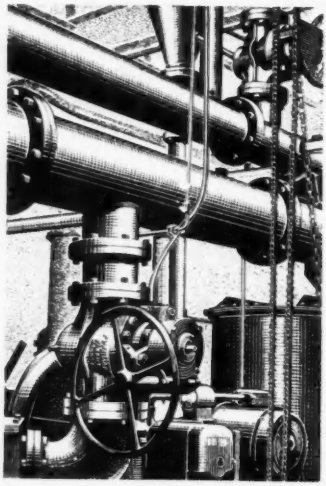

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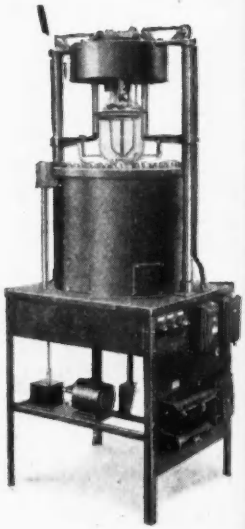

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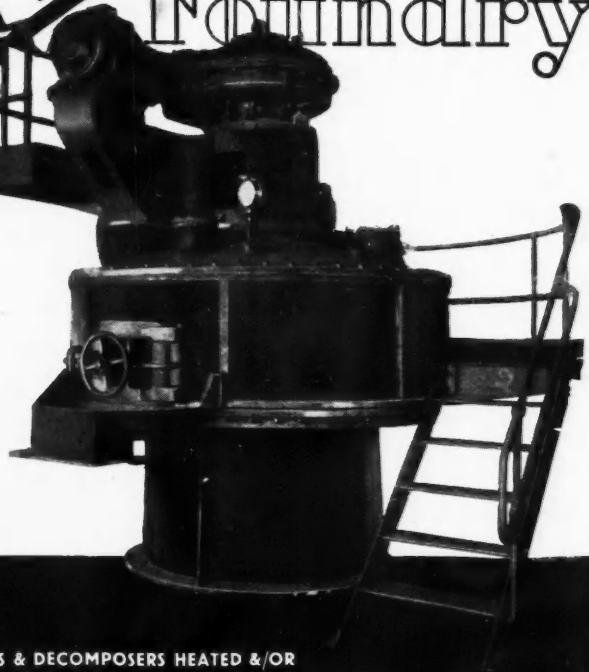

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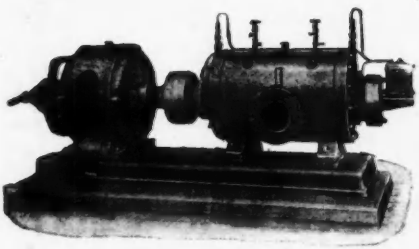

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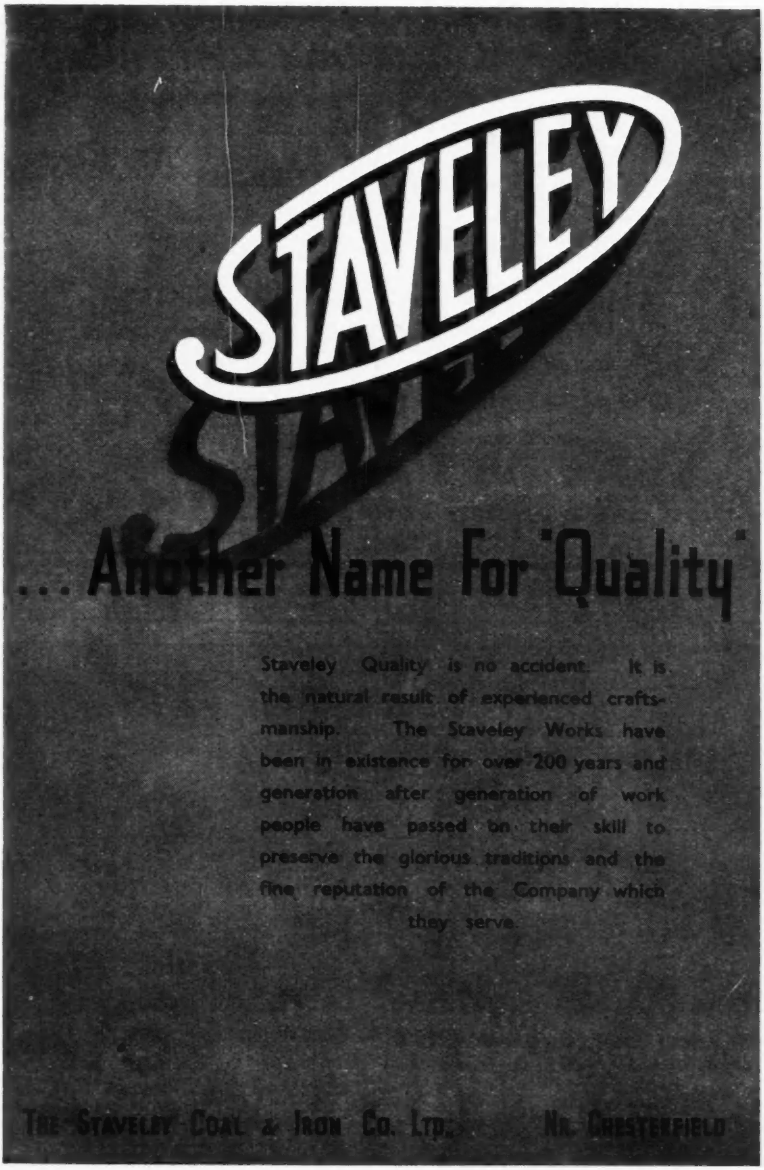
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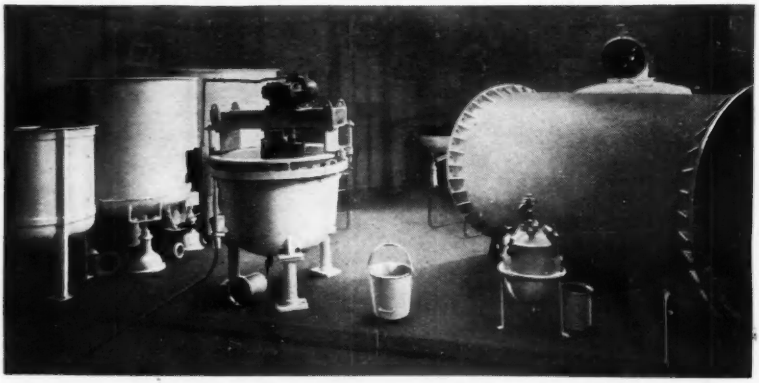

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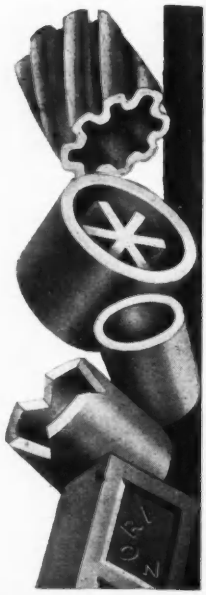

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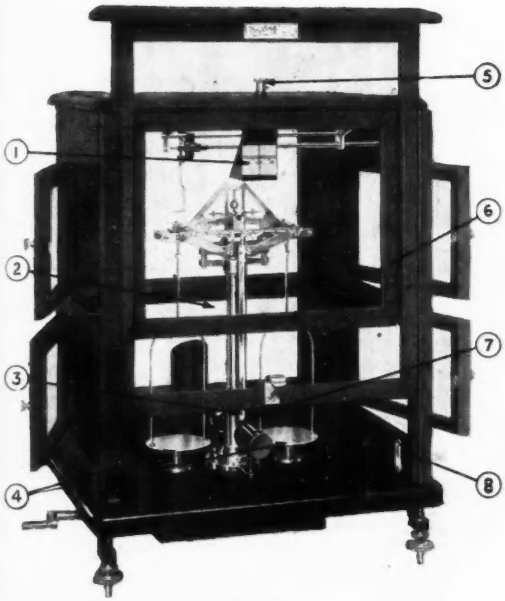

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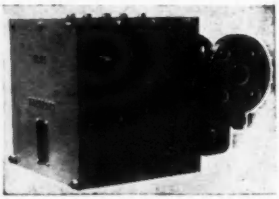

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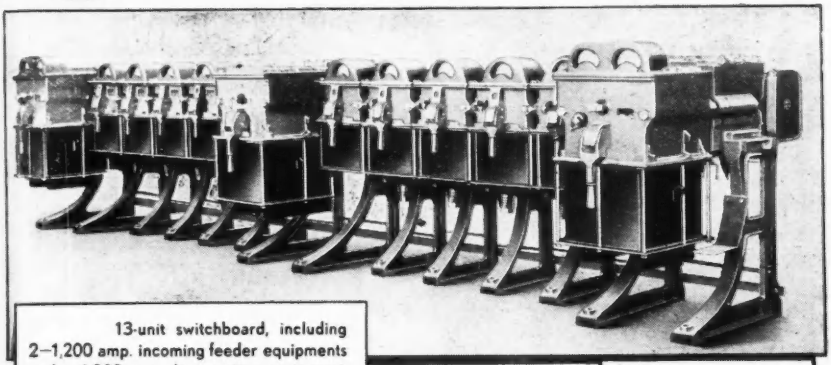

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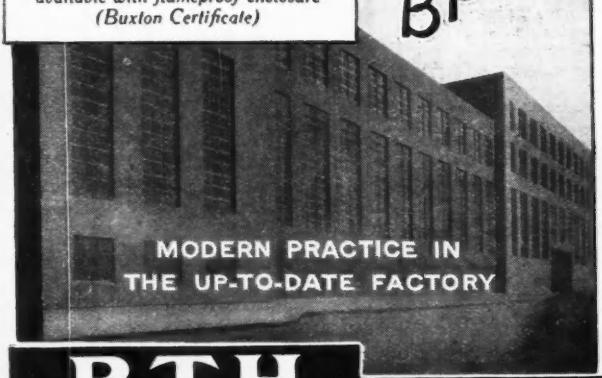

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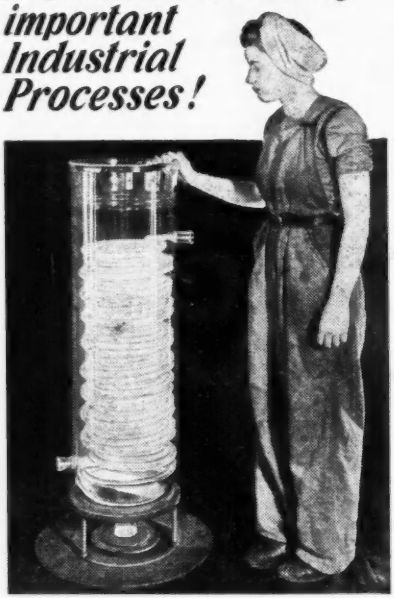

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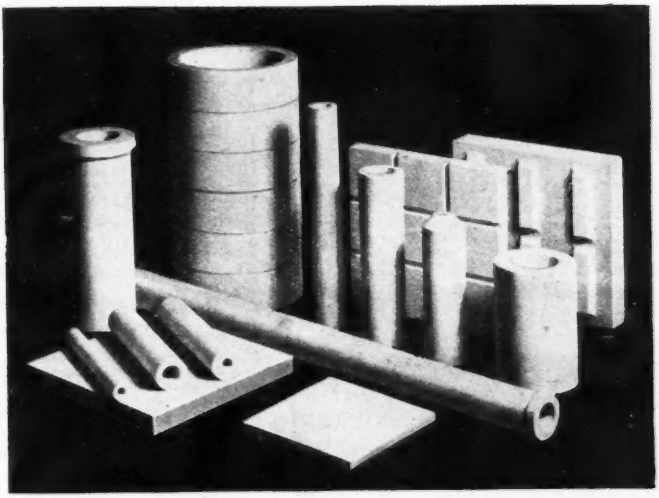

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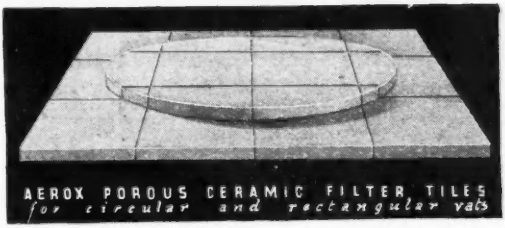

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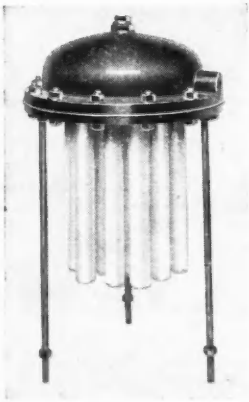

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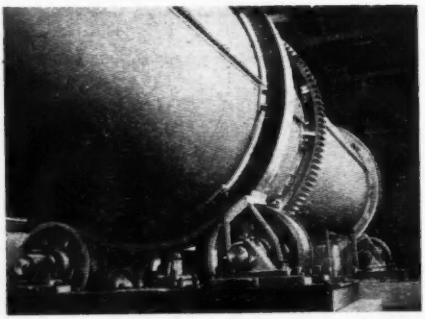

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National Chemistry

IN the Presidential Address and the Medallist's Address to the Society of Chemical Industry, Professor Rideal and Lord Leverhulme respectively touched on certain aspects of chemistry as applied to the national needs. The President covered a wide field in his inimitable manner and ranged lightly over the contacts between chemistry in national life, whereas Lord Leverhulme, speaking as an industrialist, dealt primarily with research "in prospect and restrospect."

Of all the sciences that are used in our daily life by far the most generally applied are chemistry and physics, which between them must be the basis of nearly every industry. Medical science, of course, cannot be neglected on account of its effect on health, but even here the chemist has a part to play, as evidenced by the rise of chemotherapy. The purist might add mathematics to the basic sciences, but we should be disposed to suggest that mathematics in its application to national requirements is used rather as one of the tools of other sciences. This nation has not fully realised the importance of physics, though, we believe, that one day physics will be recognised as playing as important a part in industry as chemistry does. All engineering is applied physics, but physics is treated rather like mathematics—a tool in the hands of the chemist or technologist. Chemistry is the foundation of a great deal of our national life.

Since this is so, we should agree with the two lecturers that more attention should be paid to chemistry and to science generally in schools than is done to-day. Our understanding of their addresses was that neither of these eminent gentlemen would throw overboard the classics as the foundation of education. It is true that a large proportion of our population is never taught the classics, never reads the classics, and in many instances has never heard of the classics, except as a vague name. That does not, however, in any way detract from the fact that a classical education is a very powerful tool in the training for life. We should, however, agree that the classical education is not to be regarded, as it so often is, as an end in itself, nor as filling the whole field. There should be a balance between classics and science.

There is much to be said also for a thorough overhauling of our methods of

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teaching science. Professor Rideal was apparently taught science at school solely through the explanation of how an electric bell worked. Our own recollection of science is that we sat before a master who explained, in a way incomprehensible to our intelligence, some of the mysteries of chemistry and that these lectures were made bearable only by the performance of experiments. We took away virtually nothing from several years of this combination of instruction and entertainment. What is needed is some teaching of the romance of science and of the lives of scientists, some appreciation of the value of the work they did. We need to fire the enthusiasm of the young so that they can be taught a few of the fundamental principles of science without being required at too early an age to delve into its deeper mysteries. That is a problem which must be left to the educationalists to solve; but it is of considerable importance that the youth of this country shall be made "science-minded." At present there seems no difficulty in creating interest in electricity or motors or mechanical engineering. Why not in chemistry?

Every major industry is crying out for recruits on the scientific side. Vast schemes are being laid for further research and technological development. They all depend for their success upon ample staff of high quality. The principle must be to "catch 'em young." Second only to the need for overhauling the education of the schools is the need for the diffusion of knowledge to the general public. Professor Rideal, who achieved fame in the daily papers as one of the eight scientists who did not go to Russia on a recent visit, pointed out that from the reports of his colleagues who did go, the diffusion of scientific knowledge is regarded as of the first importance in Russia. There is springing up in that country a new aristocracy based on achievements in science and technology; the existence of this privileged class under U.S.S.R. conditions must attract attention to science. Contrasted with the meagre fare and accommodation of the ordinary Russian, the equivalent of an F.R.S. is entitled to occupy four rooms, a Professor may occupy two rooms, and both receive a very generous scale of rations. Nor should it be forgotten that generous monetary prizes are given in Russia to those who have done outstanding work in science. This insistence on the importance of science in Russia is a reflection of the state of the country. A backward country with vast undeveloped resources can be brought successfully into a higher standard of living only by the application of science to all its activities. The same process can be seen at work in the U.S.A., but in a far more advanced stage.

In this country we are behind in numbers though not in quality. We have the raw material, are we using it? Professor Dobie, who has lately spent some time in this country filling the chair of American history at Cambridge, has given it as his opinion that (a) "There is no detectable difference between top American students and top British students," and (b) "The average student at the one English university I have acquaintance with is, however, better trained mentally, has the fibres in his mind better developed, enjoys the act of thinking more, and has more intellectual curiosity than the average American student." Clearly, we have the raw material. What is needed appears to be to raise the value of the scientist and technologist in the eyes of the ordinary people, so that a career in chemistry, in physics, in any branch of pure science or applied science shall rank high. This can be achieved only by informing the general public about the work that science is dong and can do. It is probably quite hopeless to suggest that a scientific education should be considered as a *sine quâ non* for at least half the staffs of our daily and weekly papers. Ability to write is not in itself sufficient: one must know also what one is writing about.

There is, however, much that the chemical industry and the chemical profession can do. Chemical bodies must act more in unity to express the views of national chemistry in this country. It is time that we went seriously about the business of building a central "Chemistry House." This is important from the point of view of national prestige, as an intellectual

centre, and as an industrial centre. The Lord President has various research councils to advise him, but among these there is as yet no Chemical Research Council. Research is undertaken by Government, by the universities, and by industry, and all fields must be adequately covered. Science must take a greater part in the Government of the country. The Parliamentary and Scientific Committee has done, and is doing, most valuable work in seeing that M.P.s and those in authority have a proper understanding of scientific problems and of what is necessary to put science on a sound basis. Lord Leverhulme pointed out that education in the humanities, in law, and in science leads to recognised and recognisable, but differing, types of mind. The country has been governed by those who have been educated in the first two ways. We agree with Professor Rideal that a purely scientific world would be a cross between a lunatic asylum and a hospital and that we should dislike it intensely. That is a very different matter, however, from introducing the scientific mind in a proper blend into the Government of the country.

NOTES AND COMMENTS

After the Avalanche

FOR the first time in this country a Labour Government is in power with a clear majority. An astonishing avalanche, in less than three months from the celebration of Victory in Europe, has swept from office the commanding figure whose national leadership all have been glad confidently to follow through the grimmest period of our history. Most people, however, are thinking rather of possible effects than of causes. The Nation has spoken with decisive voice—so decisive, in fact, that the new Government can formulate its plans without any of the restraints or inhibitions imposed by the lack of a clear majority in the House. No one can be more conscious of the gigantic tasks that face the new Administration than Mr. Attlee, who succeeds Mr. Churchill as Prime Minister. There are commitments to pursue the war with Japan to a victorious end and perils in war-torn Europe to be tackled; there is the major turnover of our own industry from war to peace needs; the great business of re-establishing millions of people from the Services in civilian life; the formidable job of making good the unprecedented shortage of houses; and the necessity of restoring our export trade, without which there can be no possible hope of good standards of life for the people of this land. That is not the whole story, but it is enough to support the suggestion that the new Government will have its hands sufficiently full in the months ahead with the urgent and vital necessities of the times without venturing on any of the risky and untried paths that were advocated by some in the torrent of pre-election speeches.

Plans and Policies

IT would be idle to deny that there are some features of the change in government which obscure for the moment the outlook for all engaged in industry and trade. Apart from the policy of Nationalisation to which the Government is in many directions committed, there are questions of taxation and of controls upon which the business community will want knowledge if the wheels of industry are to be kept turning quickly. We know something of the views of certain members of the new Government who aim at "speeding things up" by introducing more legislation by Ministerial Order, Regulation or Decree. The closest vigilance will need to be exercised if the perpetuation and extension of a system that is thoroughly distasteful to British ideas is to be avoided. Industry, moreover, will not forget in a hurry the plans for its regimentation that emanated from the Board of Trade under the direction of Mr. Dalton, or Mr. Dalton's own expression of surprise a week or two ago that he had "been able to get away with so much of it." The direction of the workers and the complete lack of freedom for an employer and an employee to make a mutually satisfactory engagement without the intervention and the sanction of the Ministry of Labour, provides yet

another example of oppressive regimentation. All these things are strangely out of accord with the ideals and liberties for the preservation of which we have fought during the past six years.

Judgment Suspended

ON very many issues, however, it is necessary to suspend judgment, more especially as there appears to be a certain lack of unanimity within the Party itself. A cursory inspection of the list of successful candidates gives rise to the feeling that there are wide divergences of aim among those returned to power. On the question of compulsory national service, for example, we feel sure that there are many members of the Party who are far from subscribing to the resolution of the Trade Union Council that some form of universal conscription must be maintained for public safety. This, indeed, is only one among many possibilities of fission. The more sober members of the Party will doubtless be content with reforms within the framework of the Constitution: the left-wing fraternity, on the other hand, may wish to tear down and build afresh in their own manner; and thus it seems inevitable that cleavages of one sort or another will develop. Meanwhile, it must not be forgotten that we are still at war and that we have already spent on the war a great deal more than we can comfortably afford. Mr. Attlee has pledged his word as a national leader to pursue the war to its end with the utmost vigour; and political considerations must not affect the determination of all ranks in industry to support this policy until final victory is assured. After that our course of action can depend on what sort of a job the new Government makes of "reconstruction."

Metallurgy Certificates

WE are glad to learn that progress is being made with the scheme for the award of National Certificates in metallurgy, which has been established by the Iron and Steel Institute, the Institution of Mining and Metallurgy, and the Institute of Metals, with the co-operation of the Ministry of Education. The certificates will be awarded to successful part-time students who are engaged in industry or other pursuits connected with the science of metallurgy. Any technical college which has a prospect of obtaining sufficient students to justify a metallurgical course may apply to the Ministry for recognition of such a course for National Certificate purposes. Authority will be granted only after the combined institutions and the Ministry have approved the curriculum, equipment, and staffing of the college concerned. The formation of the Institution of Metallurgists, a new professional body covering all branches of metallurgy, is nearing completion. Membership will be dependent on the production of suitable evidence of qualification as a metallurgist. It is understood the provisional Council has already agreed that the holding of a National Certificate in Metallurgy shall be accepted as qualifying the holder in part for the appropriate grade of membership.

More Trading Estates

SINCE reference was made in this journal last week to the advantages and disadvantages of trading estates in the paper on "The Siting and Lay-out of Industrial Works," the Board of Trade has announced its decision to use the powers recently conferred upon it in the Distribution of Industries Act to form seven new trading estates, to expand the existing ones and at the same time to convert four Royal Ordnance Factories to production for peace-time needs. Two of the new trading estates will be in the North-Eastern Development Area (South Shields and Hartlepool), one at Swansea, three in Scotland (Newhouse, Greenock and Port Glasgow, and Dundee), and one at Salterbeck in West Cumberland. These, together with the Ordnance factories at Aycliffe, Spennymoor, Hirwaun, and Bridgend, will provide employment for about 100,000. Lancashire is to be added to the list when the proposed seven estates have got into their stride. The Board of Trade's speedy action under the new Act is one of the few concrete steps yet taken to convert Britain's economy from war to peace. There is little doubt that among the thousand-odd applicants for factory space, a fair number will be engaged in the chemical and allied industries, thus encouraging a more diversified industrial production in areas which relied in the main on one industry alone.

Fused Silica

Its Properties and Use in the Electrical Industries

by A. E. WILLIAMS, F.C.S.

WHEN it is recalled that sand is used both as an insulating medium and to form the moulds in blast-furnace operations, and other high-temperature work, it is not difficult to conceive that a pure form of silica, when fused, would have many valuable applications in industry.

In the chemical and allied industries, the chemist is already familiar with the applications of fused silica to the manufacture of laboratory ware, the construction of furnaces, etc. He is also aware that the resistance of fused silica to the action of chlorine and the majority of chlorides renders it an ideal material for the construction of plant used in handling such chemicals. However, the chemist is often less well informed about the electrical properties of fused silica, although he, and not the electrician, is called upon to give his opinion when new materials for the electrical side of a firm's business are under discussion. Such applications in the electrical industries include special forms of insulation for rectifiers, motor starters, and for the electrodes of electrostatic mist and dust precipitation plants. Insulators of this material are used in parts of radio valves, and complete envelopes and insulating parts for large radio transmitting valves, which permit higher baking temperatures—and therefore a better vacuum—when evacuating. Fused silica is also used for the making of rings for mercury arc rectifiers, electric immersion heaters, mercury vapour burners, and globes, reflectors and bowls for electric lighting.

General Properties

The general properties of fused silica include a high resistance to chemical action; the majority of chemicals do not affect it in any way; it is not permeable to gases; and it has a low expansion combined with constancy of volume and weight. Fused silica has a high resistance value from the electrical point of view, and melts at about the same temperature as platinum, *i.e.*, between 1700° and 1800°C. A well-known variety of fused silica goes under the name *Vitreosil*, manufactured in two main varieties, translucent and transparent, each variety having its own particular uses. The thermal conductivity of the translucent type is 0.0025 cal./sec./°C./cm./sq. cm. For the transparent variety, the corresponding figure is 0.0035. The latter variety is the most transparent solid manufactured, and is transparent to ultra-violet and infra-red radiation.

The translucent variety of the material has a resistance at ordinary temperatures of over 200,000,000 megohm/cm., while the transparent type has a still higher value. It may be classed as an insulating material of very high value, thanks to its good dielectric properties, high breakdown value (over 10 kV./mm. at normal temperatures), and low power factor, which is around 0.10 per cent. In general, it is superior to porcelain, glass, and similar products for withstanding high frequency discharges at high voltages. This is demonstrated by the fact that an insulator, ¾ in. thick, of the translucent type, showed no increase in temperature when subjected to peak voltages of 5000 to 6300 at 22,700 kilocycles for 30 minutes; while porcelain heated up to 112°C. and cracked after 10 minutes at 4200 kilocycles. One of the disadvantages of glass or porcelain insulation is that the introduction of even a minute air bubble into the plastic mass during manufacture lowers its insulating value very considerably, and that the presence of such bubbles cannot be easily detected by a simple inspection. The following table, from work done by the National Physical Laboratory, shows the difference in specific resistance, at various temperatures, of fused silica and Jena glass, which latter is noted for its high resistivity.

Fused Silica		Jena Glass	
Temp. °C.	Resistivity Megohm/cm.	Temp. °C.	Resistivity Megohm/cm.
15	Over 200,000,000	16	Over 200,000,000
150	„ 200,000,000	115	... 36,000,000
230	... 20,000,000	150	... 18,000,000
250	... 2,500,000	750	... 0.1 to 0.4
350	... 30,000		
450	 800		
800	 20		

Seamen (*Phys. Rev.*, 1928, *31*, 119), in recording work done on conductivity at various temperatures, gives the following figures for the specific resistance of transparent fused silica:

Temp. °C.	277	477	677	877
Ohm/cm.	4.46×10^9	2.09×10^7	1.35×10^6	2.69×10^5

Investigations on the surface resistance of fused silica have been carried out by R. W. Clark (*Edin. Jour.*, 1934, *8*, Pt 3, 112), who shows that surface resistance varies with the humidity of the atmosphere and the form of surface. The following figures are culled from his work:

Humidity per cent.	Type of Surface	Surface Resistance Ohms/cm./cm.
30 ...	Translucent ...	1.5×10^{16}
30 ...	Moulded ...	2.4×10^{15}
50 ...	Sand ...	5.0×10^{13}
60 ...	Machined ...	7.5×10^{13}

The dielectric properties of *Vitreosil* type

of fused silica are as follows: specific inductive capacity: transparent type 3.8, translucent type 3.7. Power factor: transparent and translucent, under 0.1 per cent. Phase difference: transparent and translucent, of the order of 35/secs. Breakdown (puncture) values: the following figures are the minimum values for the thicknesses given:

Temp. °C.	Thickness above 5 mm. Translucent	Thickness above 2 mm. Transparent
10 to 25	10 kV/mm.	20 kV/mm.
500	2 to 3 kV/mm.	3 to 5 kV/mm.

Higher values have been obtained for thinner pieces, but the true value in such instances is influenced appreciably by the shape of the test piece and other factors. Further data and comparisons with other materials are given by B. Moore (*J. Soc. Chem. Ind.*, 1936, 55, 31). Flash-over breakdown: the National Physical Laboratory has obtained the following data for the translucent variety:

Temp. °C.	V/cm.
10	4800
200	5500
400	3250

The British Thomson-Houston Co., Ltd., has protected a method (B.P. 543,159, of October 21, 1940) for fusing silica, in which the space for the silica is surrounded by a carbonaceous electric resister, which is surrounded by a porous mass of refractory oxide, such as beryllium oxide or zirconia, which is self-sustaining and inert to carbon at the desired temperature. The whole is surrounded by a metal casing, within which a vacuum can be created. The silica to be fused is contained in a crucible made of the refractory oxides, beryllium oxide or zirconia.

Some Applications

A simple and inexpensive form of electric furnace consists essentially of a fused silica tube wound with resistance wire, and such a tube can be threaded on its outer surface to maintain the resistance wire in position. Tubes of the material are used also in the construction of electric furnaces of the high-frequency induction type. Due to its high transparency to ultra-violet light, and its high resistance to heat, the transparent variety is universally employed for the envelopes of mercury vapour burners. These burners are made in all types, arc and discharge, and both for industrial and for scientific use. The discharge types of burner have only in the past few years come on the market and are transportable and of robust construction. They are also self-starting, no tilting being required. In some industries, because of the increasing interest in irradiated oils, and in food products such as milk, etc., mercury vapour burners have become much more important in recent years. For home use a very compact mercury vapour tube ultra-violet unit is made. The material is in use in the form of pipes for electrostatic mist and dust precipitators, owing to its very high heat-resisting and electrical insulating properties, while rings for mercury rectifiers are made in all required dimensions. Electric immersion heaters when required for heating water or other inert liquids generally have an exterior casing of metal, and for such cases the metal is usually satisfactory.

There are, however, instances in which it is required to heat corrosive liquids, as in chemical works, plating baths, pickling tanks, etc., and for this purpose a metal-cased immersion heater would have a very short life, owing to corrosion. In this application fused silica casings have been successfully used, for, thanks to its high resistance to chemical corrosion, the heated liquor does not affect it. It withstands the sudden temperature changes inseparable from immersion heaters, and is also a good insulator in the materials heated. These immersion heaters are now manufactured in various sizes, with from ¼ to 5 kW rating, the length of the heater varying from 10 to 30 in. Various kinds of thermal cement powders, which are also acid proof, have been developed for use in conjunction with the *Vitreosil* type of fused silica equipment when making joints, etc., and the properties of these cements follow closely those of the fused silica itself.

Electrodepositors' Society

New Council

AT the recent annual meeting of the Electrodepositors' Technical Society, the following office-holders were elected for the session 1945-46: *President*, S. Wernick, Ph.D., M.Sc.; *Immediate Past President*, J. R. I. Hepburn, D.Sc., Ph.D., F.R.I.C.; *Vice-Presidents*: H. J. T. Ellingham, Ph.D., A.R.C.S., A.M.I.Chem.E., F.R.I.C.; G. E. Gardam, Ph.D., A.R.C.S., F.R.I.C.; F. L. James; *Hon. Treasurer*, F. L. James; *Deputy Hon. Treasurer*, S. W. Baier; *Council*: A. E. Ensor, A. W. Hothersall, M.Sc. Tech., H. A. Manning, J. Perring, A. Smart, B.Sc.; *Ex-Officio Members*: H. Silman, B.Sc., A.M.I.Chem.E. (chairman, Midlands Centre), R. C. Davies (hon. sec., Midlands Centre), E. A. Ollard, A.R.C.S., F.R.I.C. (hon. sec., Standards Committee); Dr. H. J. T. Ellingham and Dr. A. Hickling are the Faraday Society's representatives on the Council.

The U.S. authorities in Germany have removed 13 industrialists from the board of the Kalle & Co. A.G., a subsidiary of the I. G Farben, because they were members of the Nazi party.

Oil and Colour Chemists' Association

Annual General Meeting

THE annual general meeting of the Oil and Colour Chemists' Association was held at Manson House, 26 Portland Place, London, W.1., on July 26. The President, Dr. H. W. Keenan, was in the chair. At the suggestion of the president, the meeting observed a short period of silence as a mark of respect to those who had fallen during the war.

A resolution was considered to reduce the total number of members of the council to 23, as compared with the present maximum of 29, and after a prolonged discussion, the resolution was adopted by 18 votes against 12.

Annual Report

Introducing the annual report of the Council for 1944-45, the hon. secretary (Mr. A. J. Gibson), said that the council and its subsidiary committees had been busy, more especially the Technical Advisory Council and the Technical Education Committee. One of the outstanding features of the year was a very successful association meeting in Manchester last November. He paid tribute to Mr. T. Drummond Kerr and his co-workers who had prepared the reports on the progress of applied chemistry. Tribute was paid to Mr. S. E. Shaw, who had done a great deal of work in connection with the Association's finances.

The number of new members since January 1 was 130. The *Journal* had a circulation of 1300, and the demand from overseas was increasing rapidly. The work of the Parliamentary and Scientific Committee was stressed in the Report.

New Officers

The following officers were elected: *President*, Dr. H. W. Keenan (re-elected); *vice-presidents*: Mr. G. A. Campbell, Mr. H. Clayton, Dr. L. A. Jordan, Mr. T. Drummond Kerr, Mr. C. A. Klein; *hon. secretary*, Mr. A. J. Gibson; *hon. treasurer*, Mr. G. W. Read Baker; *hon. research and development officer*, Mr. C. G. Tinsley; *hon. auditor*, Mr. W. Garvie; *section representatives on the Council*: Mr. V. C. Thompson (Bristol), Dr. W. H. Pedelty (Hull), Mr. David E. Roe (London), Dr. H. A. Hampton (Manchester), Mr. E. Ruter (Newcastle-on-Tyne), Mr. J. Milligan (Scotland).

The names of chairmen of sections for the session 1945-46 were announced as follows: Mr. W. G. Wade (Bristol), Mr. J. Pryce-Jones (Hull), Mr. R. J. Ledwith (London), Mr. D. M. Wilson (Manchester), Mr. George Murray (Newcastle-on-Tyne), Mr. J. Crombie (Scotland).

In reply to a question, the president said the names of the officers of the New South Wales section could not be announced, for that section had not yet held its first meeting.

The following were elected to the Council by the free vote of the membership of the Association: Mr. G. Copping, Dr. V. G. Jolly, Dr. J. J. Sleightholme, Mr. S. Sowerbutts, Mr. F. Faucett, Mr. F. J. Gay.

President's Remarks

The president, in his address, referring to the formation of the Association's first overseas section, said that during the year he had been in touch with New South Wales, where he had felt the technical side of the paint industry was not organised in the way it is organised here. The suggestion that that was the case had been welcomed; and at the last council meeting, Mr. A. R. Penfold, the Curator of the Sydney Technical Museum, had presented in person a petition to council, signed by 50 members, for the formation of the New South Wales Section. That was accepted, and the section was formed.

After recalling that he had looked into every working part of the Association and had visited all the sections during the past year, he said that he would issue a referendum on the subject of subscriptions later. There were various aspects of expenditure to be considered, and it was well to look forward to the day when the Association would have to consider the appointment of a paid secretary, at a level commensurate with its dignity. Finally, the president acknowledged his gratitude to his colleagues on the Council, and in particular to Mr. Gibson, the hon. secretary.

A complete index to their chemical plant catalogue has been issued by the KESTNER EVAPORATOR & ENGINEERING CO., LTD., 5 Grosvenor Gardens, S.W.1. They have also produced a new edition of their leaflet No. 270, dealing with Axial Flow Fans for Corrosive Gases.

Following the recent announcement (*see* p. 110) that supplies of sodium chlorate were to be released on to the market for weed-killing purposes, the STAVELEY COAL & IRON CO., LTD. (Chemical Sales Dept., Hollingwood, nr. Chesterfield) have issued a booklet of instructions for its application to gardens, paths, lawns, arable land, etc. A clear warning on the dangers accompanying the use of sodium chlorate is both incorporated in the booklet and included in the packages in which the material is sold.

North-West Fuel Club

Luncheon in Manchester

A NORTH-WESTERN Fuel Luncheon Club has been organised to function on generally similar lines to the London Fuel Luncheon Club, which has been running successfully for many years. The committee has been greatly honoured by Sir Frederick West, K.B.E., J.P., accepting its invitation to become the first president. A full programme is being arranged of meetings and speakers for the coming session. The first luncheon meeting provisionally is fixed for October; full details will be circulated in due course in a forthcoming bulletin. It is planned to hold meetings at the Engineers' Club, Albert Square, Manchester, once in every month, with the possible exception of one or more summer months, each luncheon to be followed by an address of about 30 minutes' duration.

Membership is limited to those who in the opinion of the committee are directly associated with the technical side of the fuel industries, and who are members of one or more technical societies largely engaged in the study of fuel problems. Application for membership must be submitted on a form to be obtained from the hon. secretary.

The annual subscription to the club shall be £1 1s. payable in advance, commencing July 1. Members joining the club after January 1 of any year shall pay half-rate subscription for the period ending June 30.

The charge per luncheon is not expected to exceed six shillings, inclusive of gratuities, but not including liquid refreshments. Bulletins will be published and circulated to all club members in connection with every luncheon meeting.

Managing Committee

The management of the club shall be vested in a committee consisting of the hon. secretary and the hon. treasurer, together with not more than six ordinary members, of whom two shall be appointed by the committee of the North-Western Section, Institute of Fuel. The president of the club and the chairman of the North-Western Section, Institute of Fuel, shall be *ex-officio* members. This committee at present is constituted as under: S. J. Baily, A.M.Inst. C.E., M.Inst.F.; R. Baker, M.Inst.F., A.Inst.Gas E.; S. N. Duguid, B.Sc., F.Inst.F.; P. T. Kirkman, M.Inst.F.; J. H. Orr, M.Inst.F.; A. H. Slade, B.Sc., M.Inst.F.; *Ex-officio members*: *President*, Sir Frederick West, K.B.E., J.P.; *Chairman, North-Western Section, Institute of Fuel*, A. C. Dunningham, D.Sc., A.R.I.C., F.Inst.F.

Communications should be addressed to the hon. organising secretary, Mr. R. Baker, Selas Works, City Road, Manchester, 15 (Central 2648-9).

New U.S. Insecticides

Mosquito Control Work

THE discovery of new and powerful insecticides has enabled American farmers to reduce losses in fruit, vegetable, and poultry crops to a remarkable degree, according to reports of the Agricultural Research Administration, U.S. Department of Agriculture.

Sodium Fluosilicate

The discovery that a bait, containing sodium fluosilicate, kills both the Puerto Rican and southern mole cricket has placed in the hands of vegetable and berry growers an effective method of controlling, at reasonable cost, pests estimated to cause an annual damage of over $1,250,000 in the Southern States. The average cost for the poison-bait treatment is less than $1.50 an acre, for a simple mixture of 8 lb. of the sodium chemical mixed with 100 lb. of mill-run bran.

Sodium Fluoride

The use of sodium fluoride as a treatment for poultry lice enables poultrymen to eradicate all lice from their flocks by a simple dipping process that was developed by F. C. Bishop, Assistant Chief of the Bureau of Entomology and Plant Quarantine. Other methods such as vaporising oils are frequently used, but they do not have the ability to cling to poultry feathers long enough to destroy the nits. Insect powders are also applied to baby chicks. Larger fowls are dipped in a solution of one ounce of sodium fluoride to a gallon of tepid water.

The "Aerosol Bomb"

In 1941, the insecticide Aerosol in bomb form was invented by Mr. W. N. Sullivan, entomologist, and Mr. L. D. Goodhue, of the Division of Insecticides Investigations for Mosquito Control Work. Since this discovery, more than 16,000,000 "Aerosol bombs," have been distributed to protect the Armed Forces against malaria-carrying mosquitoes. The bomb is a small metal container which applies insecticides in a new way by suspending them in the air in a thin mist, which remains active for a longer period than sprays.

When the Aerosol bombs are used a small valve is opened to cause a sudden change in the pressure of the chemical within, thus agitating the fluid to a rapid boil and allowing it to escape through a small hole. Contact with the air causes the fluid to change to vapour, which remains suspended long enough to clear tents, barracks, foxholes, and military transport planes of mosquitoes and other disease-carrying insects. The use of this insecticide is now restricted to the Armed Forces, but is expected to be of great value in peace time, when malaria control will undoubtedly be intensified.

Metallurgical Section

Published the first Saturday in the month

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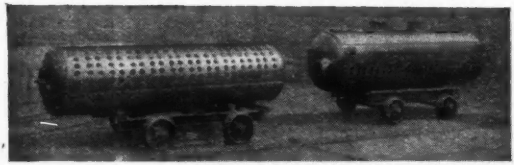

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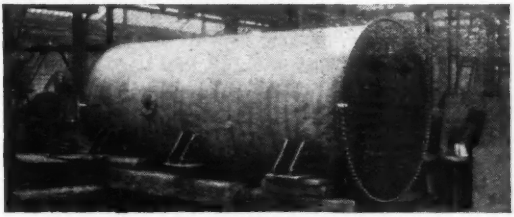

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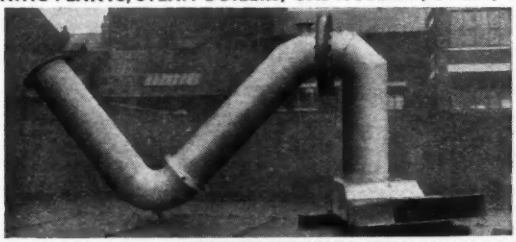

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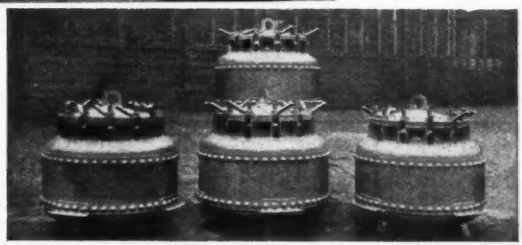

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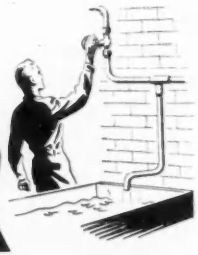

Expert advice for water users

Pumping and conveying water to where you want it take a lot of power (and much fuel and money). Water is even more precious if it has been heated or purified in your works.

How to make the best use possible of your water supply is told in these handy booklets:

FUEL ECONOMY BY WATER SAVING (*Bulletin No.* 31)

This is a survey of the economies (many of them substantial) that are possible in water supply for boiler feed, drinking and washing, process and cooling. It tells you, too, how to clean water mains and plant, and how to keep them clean.

WATER TREATMENT (*Bulletin No.* 39)

The correct treatment of water, whether for boiler feed, cooling or process is a matter for the specialist. This Bulletin surveys the whole field and describes briefly the methods available for overcoming your difficulties.

BLOW-DOWN (*Bulletin No.* 35)

Too often the blowing down of boilers is merely a matter of routine, bearing no relation to need. Excessive or insufficient blow-down are both serious fuel wasters. This Bulletin tells you why, when and how much to blow down.

THE UNORTHODOX USE OF ECONOMISERS (*Bulletin No.* 30)

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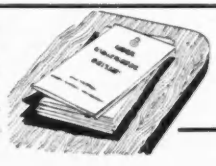

ISSUED BY THE MINISTRY OF FUEL AND POWER

Metallurgical Section

August 4, 1945

The Cornish Mining Industry—I

The Prospects for Tin, Arsenic and Tungsten

by JOHN H. TROUNSON

DURING recent months sensational statements have appeared in the daily Press concerning the imminent closing of certain important Cornish mines and the disastrous unemployment that is likely to recur as a consequence of these happenings. It may, therefore, be of general interest to review a few facts concerning the industry at the present juncture.

In order to understand the present position, it is first necessary to refer briefly to the period of the war of 1914-18 when the Government urged the Cornish mining companies to expand output to the uttermost, notwithstanding the fact that a large percentage of their employees had been conscripted for the Armed Forces. To this call the industry responded most loyally, but with the acute shortage of man-power it was inevitable that development would have to be drastically curtailed and in some instances almost entirely stopped. Such a policy in mining, however, is suicidal and only a few of the more fortunately situated companies were able to survive its crippling effects when the acute slump in metal prices followed in 1921-22.

Tin Price Restriction

In addition to the strain imposed by this period of forced production and restricted development, the Cornish mines were dealt a mortal blow by the Government's severe restriction of tin prices. This policy was the result of an understanding reached with our American Allies who at that time dominated the world's production of copper, a metal of which we were in acute need. In exchange for a limited copper price the British Government held the price of tin far below that which would have prevailed in a free market (that this is true was demonstrated by the phenomenal rise that occurred after control was removed). As a consequence of this artificial limitation of the price of tin the Cornish companies lost an immense sum of revenue at a time when they were having to pay grossly inflated prices for all their supplies. Of course, this policy of price control affected producers in every part of the world, but its most injurious consequences were felt at home where the Cornish companies, employing white labour and using great quantities of coal, timber, explosives and other supplies, were between the devil and the deep sea.

The agreement between Allies to restrict metal prices may have been necessary in the interest of the nation as a whole, but it was a gross injustice that one and only one section of the community, namely those concerned in Cornish mining, should have been called upon to bear the whole cost of such a policy. The fact remains that it was as a direct consequence of these injurious acts and the generally iniquitous treatment it received at the hands of the Government that the industry was nearly extinguished in the slump years that followed in the early '20's. It is no exaggeration to say that it was bled white in the national interest and then abandoned to its fate.

With the return of higher metal prices during the mid '20's, a considerable revival in tin, tungsten, and arsenic mining occurred and, notwithstanding restrictive taxation and certain ill-advised and even discreditable company flotations, a considerable measure of success was again achieved by the major Cornish producers. With the approach of the '30's, however, the industry was again overtaken by a disastrous slump which, on this occasion, reached catastrophic proportions affecting business throughout the whole world. Consequently, it is not surprising that only a few of the more fortunately situated Cornish companies survived this, the second holocaust within ten years, and the troubled and unsettled period of wild price fluctuations which followed and finally culminated in war in 1939.

A Policy of Neglect

In 1938, when it was at last realised that war was again a possibility, the Minister for Co-ordination of Defence invited the British metalliferous mining industry to submit details of its maximum possible output in time of war. On learning of the then shrunken capacity of the Cornish section of the industry the authorities decided that it was of virtually no importance whatever to the nation and, in consequence, with

one slight exception, nothing at all was done to encourage production in spite of the imminence of war. Notwithstanding the ultimate outbreak of hostilities with Germany and the steadily worsening relations with Japan, the Government continued to ignore the Cornish mineral deposits. A direct request for assistance from one very promising tin mine, then still in the development stage, was refused, and in consequence of the impossibility of raising additional capital under war-time conditions the mine was abandoned and dismantled. In addition, schemes for working certain arsenical propositions which had been favourably reported on by the Government's own advisers were torpedoed by the Treasury on the score of cost. Meanwhile, the younger men in the mines were still being conscripted for military service and up until the very time of the Japanese attack on the eastern tin fields the authorities were encouraging Cornishmen to leave the home mines and to go out to the Rhodesian copper properties.

Operations of the "Control"

With the lightning Japanese capture of the greater part of our tin and tungsten supplies the authorities at last awoke to the importance of our native ores, but the hasty and ill-advised measures that were then initiated in an effort to increase home production have been an almost complete failure. No one conversant with the facts will deny that there has been an ample expenditure of public funds, but it is equally undeniable that the useful results have been negligible. To anyone unacquainted with the operations of the Government's war-time "Control" the natural inference is that the Cornish ore bodies are virtually exhausted and that there is therefore very little scope for successful commercial mining within the county. Such a view, however, is entirely at variance with the actual facts, and it would thus seem useful at this time to recapitulate briefly a few of the happenings under Government control that have led up to the position in which the industry now finds itself.

The Ministry of Supply, which was charged with the responsibility of increasing home production, formed an operative body entitled the "Non-Ferrous Minerals Development, Ltd.," known colloquially as the "Control." This authority's activities took two forms: (1) establishment of new producers on Government account; and (2) control of existing producers with a view to stimulating their output.

Before dealing with the effects of control of the existing mines it will be useful to review briefly the authorities' efforts to create new producers. From its inception the "Control" was warned by mining men conversant with Cornwall that the old mine dumps and the alluvial deposits that still remained were too poor to be worth working and they advised that it would be best to concentrate all available labour and energy on re-opening certain proved mines that had recently been closed down through the low price of tin. In spite of this friendly and urgent advice, the "Control" devoted an immense amount of time and energy to an exhaustive examination of numerous dumps and alluvials. In most cases these yielded negative results, or, when worked, proved to be hopelessly uneconomic both in cost and in man-power. On the other hand, elaborate and costly plans that were prepared for the working of dump propositions were, after endless delays and investigations, vetoed on the score of expense.

In addition to these abortive efforts, the "Control" dissipated its available man-power in ineffectively investigating a number of small and shallow mines, some of which offered little chance of success, though others were reasonable prospects. Every one of these, however, was hastily abandoned before any conclusive results could be obtained and the "Control's" efforts to bring new producers into being ended in complete and total failure. It is to be noted that not a single one of the properties that had been recommended by competent local mining engineers was tried, the alleged reason being that these would take too long to bring into production; the ultimate result, however, was that practically nothing at all was achieved.

An Abortive Project

As regards the existing mines the "Control" adopted two methods of procedure. In one case they purchased an "opencast" tin-wolfram property from the private interests who had started it and greatly extended the scale of operations. After the very large and extensive new plant had been completed and put into operation the mine was worked for only a few months and was then closed down as it was found to be uneconomic. In the case of the other established mines the companies owning them were allowed to remain in possession, but they had to work under the direction of the "Control." That body concluded agreements with the companies whereby it purchased the whole of their output on a cost-plus-percentage basis. Unfortunately, the rate of profit allowed was based on that obtaining in the years just prior to the war. As this period included a severe slump in metal prices it followed that the profit margin allowed to the companies under the "Control's" jurisdiction was an exceedingly small one. No patriotic person wishes to profit by the country's need in time of crisis, but mines are wasting assets with a relatively short life, and the nominal profits

permitted to the companies have been quite inadequate to enable them to build up a cash reserve with which to face the inevitable post-war slump.

Furthermore, under State control, and on a cost-plus-percentage basis, a multitude of increases in working costs have occurred over which the companies have little or no control. Not only has the cost of coal and other supplies risen greatly but the whole labour position has deteriorated most seriously. Under the Essential Work Order the mines have had to employ numerous youths who were "directed" to the industry and who, on the whole, have proved to be completely useless in increasing production. Not only has the industry had to employ these men, but it has been deprived of all effective control of labour in general; absenteeism is rampant and the authorities seem unable or unwilling to exercise any effective control. Likewise, under the jurisdiction of the Ministry the companies have been directed to concede numerous wage concessions and all these factors have had a cumulative effect in raising costs to a prohibitively high level.

As long as the Government continues to pay the costs the full effect of these changes is not generally realised, but if control is suddenly abandoned the mines will find themselves in a hopelessly uneconomic position. As the industry has been sacrificed in the nation's interest during the two World Wars, common equity demands that the Government shall at least give that part of it which remains a helping hand at this juncture to enable it to tide over the critical period that is certain to follow the end of hostilities in the East.

East Pool Mine

This brief history of the industry during the past 30 years has, it is hoped, enabled the reader to appreciate the position in which it is situated at the present time. It now remains to explain in greater detail the circumstances surrounding the expected closing at an early date of the East Pool mine which, if it does occur, will also endanger the existence of the neighbouring South Crofty Company. It is the acute crisis occasioned by the feared closing of the East Pool mine that has given rise to the stories in the daily Press to which reference was made at the beginning of this article.

Reverting for a moment to the year 1920, it was then that the East Pool Company was driving an important tunnel at a depth of 1570 ft. from surface to explore the undeveloped eastern part of their property. In the summer of that year this drive, known as the Tolgus Tunnel, intersected an exceedingly important ore body which, on being sampled, was found to contain the unusually high value of 158 lb. of mixed tin oxide and wolfram per ton over the large width of 13 ft. The immense importance of this find was enhanced by the probability that it was a re-discovery in virgin ground of the eastern continuation of the celebrated "Great Lode" that was the mainstay of the old East Pool mine for many years and which is still being worked further westward in the neighbouring South Crofty mine as the "Main Lode." This is one of the major lodes of the area and its re-discovery in virgin ground gives good reason for thinking that its development would result in a highly profitable mine.

Danger of Inundation

Unfortunately, when this great ore body was intersected a large feeder of water was cut with it, and as the then existing pumps were working to the limit of their capacity, it was necessary, in order to avoid inundation of the mine, to build a temporary dam in the tunnel until such a time as additional pumping plant could be installed. After the erection of the dam, and during the time that it was impossible to continue the development of the great lode sealed off behind it, a diamond drill hole was bored north of the tunnel and this intersected several additional lodes, one of which was found to carry good tin values. This further development underlined the great potentialities of the eastern part of the company's area, but the immense slump of 1921 had by this time overtaken the mines and, with the exception of pumping, all operations were brought to a standstill in February, 1921. In May of that year the company's misfortunes were completed when a great collapse of ground which occurred in the old workings wrecked the two main hoisting shafts and compelled the complete abandonment of the whole of the workings including the highly promising discoveries in the Tolgus Tunnel area.

Until the cessation of operations the East Pool company had been working very rich lodes in the northern part of its area, and it was accordingly resolved to sink a large new shaft to the north of the old workings to enable the development of these northern lodes to be resumed. This was accordingly done and for a number of years the northern part of the mine continued to be highly productive. For some while prior to the war, however, these lodes were becoming poor and it was realised that it would be necessary to resume the development of the highly promising Tolgus Tunnel area that had been lying dormant since 1920. To carry out this scheme additional capital expenditure was required to permit long drives to be extended from the new shaft to the tunnel area, but the repeated slumps preceding the war had exhausted the company's cash resources.

When the Government took over the con-

trol of the mine it was advised that the existing workings were becoming increasingly poor and that they offered little hope of any improvement. It was pointed out to the authorities that the only hope of restoring the mine to large-scale production was to drive back to the Tolgus Tunnel area and to open up the lodes known to exist in that part of the mine. The necessary driving could have been completed within about 7 to 8 months, and in less than a year it is probable that an appreciable production would have begun from these lodes.

Urgent Supplies Demanded

The "Control," however, was so engrossed with the urgency of obtaining *immediate* supplies that it would not accept this advice and proceeded to concentrate all its energies and a great deal of money on the further development of the existing ore bodies. As local engineers had foreseen, this policy ended in failure and, with the lodes becoming increasingly poor with increased depth, the production of tin from East Pool in 1944 fell to approximately half of what it had been when the "Control" first assumed responsibility.

Under these conditions the cost per ton of metal produced had reached a prohibitive figure and it was therefore not a surprise when the Ministry of Supply notified the company at the end of March last that it was giving three months' notice of its intention to cease purchasing the company's output of mineral. In a circular to the shareholders the chairman pointed out that this would entail the closing of the mine unless other assistance could be obtained. He added that in the opinion of the board if their recommendation to the Ministry in August, 1942, to open up the Tolgus Tunnel area had been adopted the mine would by now have been in full production on an economic basis. In view, however, of the present conditions, the complete uncertainty facing the industry in the immediate post-war years, and the fact that the company owes a £30,000 debenture to the Government it is obviously impossible to raise additional capital at the present time.

Employees Discharged

As a result of the Ministry's decision, production ceased in the early part of June and a start was made with dismantling and bringing to surface the underground equipment. Already the bulk of the underground employees have been discharged and others will follow shortly. Now, an additional uncertainty has arisen as the Ministry of Supply is winding up its commitments in Cornwall and the Ministry of Fuel and Power is for the time being taking over the control of the Cornish mines. The latter Ministry has been strongly advised to carry out an extensive diamond drilling programme at East Pool, as it is thought that the property yet contains several excellent prospects that ought to be investigated before a final decision is reached to abandon the mine altogether. Pending a decision on this matter, pumping is being continued and a number of men are being retained in case they are necessary for carrying out the drilling campaign.

The stoppage of production that has thus occurred at East Pool has already thrown a considerable number of men out of work and others will shortly be joining them. Though it will be difficult to find suitable work for many of the surface men the majority of the underground personnel can readily be absorbed *at the present time* by other mines that are short of labour, but with the return of numerous men from the Armed Forces and the inevitable closing of munition factories the local unemployment problem threatens to become serious.

Danger to South Crofty

The trouble, however, does not end there, for the cessation of pumping at East Pool is likely to jeopardise the future of the neighbouring South Crofty mine which already has to handle so much water that any large addition to its pumping costs will render it uneconomic at any price for tin that can reasonably be expected during the next few years. If South Crofty, which is a larger employer and a very productive mine, should also be compelled to close, the loss of employment and trade in the district would be disastrous. It will, therefore, be realised that the closing of East Pool is producing serious problems for the largest industrial area in Cornwall. The threat to future trade and prosperity in the district is raising serious issues as to the Government's responsibility for preventing distressed areas from developing again immediately after the war has ended.

Thinking people are questioning whether it is beneficial to the nation as a whole to allow industries such as metalliferous mining to die out for, quite apart from the large amount of direct and indirect employment which it creates, it is clear that we shall have to export as much and import as little as possible in the future. The wisdom of neglecting priceless assets under our own soil and importing an equivalent amount of metals from overseas is beginning to seem highly doubtful. If this is true in peace it is a thousand times more so in war, and this country has had good cause during the past five years to regret the complete neglect of its metalliferous deposits for 30 years.

(To be continued)

Steel Research

New Organisation Formed

A LOGICAL sequel to the steel industry's Five-Year Plan to spend £120,000,000 (*see* THE CHEMICAL AGE of July 28) is the decision to form a new central research association in London, to be called the British Iron and Steel Research Association. Its annual revenue will total about £400,000, of which £250,000 is to be contributed by the industry, while the balance will be met by a grant from the D.S.I.R. and from other sources. At the head of the new formation will be Dr. C. F. Goodeve, F.R.S., whose career is reviewed in our Personal Notes.

The new Principal has explained that valuable work has been done by the laboratories of the country's steel makers, and by the Iron and Steel Institute, as well as by the Iron and Steel Federation's research council, but the new association's task will consist in co-operative research and exchange of information on a much wider basis, working with such research organisations as study raw materials, particularly coal and plant design. It will establish more intimate contacts between the producers and the users, such as the railways, shipbuilders, and engineers. The industry's own research organisation would work in conjunction with the universities, and teams were already active in Cambridge, Sheffield, Newcastle, London, Birmingham, Swansea, and Glasgow. At the works of member firms full-scale development work would be put in hand.

It is understood that one aspect of the work will concentrate on problems connected with coke and refractories, while another branch will be devoted to the use of poor-quality British ores; a special division will study the important and frequently underestimated subject of design and layout, with a large research programme on alloys.

The association will have its own laboratories with more elaborate equipment than those of individual firms, and an interchange of experts with overseas countries is planned. This research programme, which is intimately connected with the modernisation plan of the industry, should make it possible for the British iron and steel industry to regain that leading position which was, during the last two or three decades, lost to foreign steel makers.

Factories Act Booklet

Summary for Iron and Steel Works

A BOOKLET, giving in concise form a summary of the sections of the Factories Act, 1937, applying to iron and steel works, has been prepared by Mr. E. L. Macklin, O.B.E., consulting safety and welfare officer of the United Steel Companies, Ltd. Intended primarily for issue to officials of the company, the booklet fulfils a need of all iron and steel concerns, and arrangements have been made to produce copies for *bulk* sale to any companies interested in the sections of the Act concerned. The booklet can be supplied either in Rexine binding, at 2s. 6d. per copy, or in paper covers, at 1s. 3d. per copy. Individual orders *cannot* be supplied owing to the difficulty of handling such inquiries.

Surface Finish of Metals

New U.S. Evaluation Method

DURING recent years great progress has been made in the art of mechanically finishing metal surfaces, as regards both quality and control of the finish. However, no method of specifying a finish particularly has as yet been developed sufficiently to be universally acceptable to industry. An important element in such specifications is the evaluation of the depth of surface markings or serrations. A new method of qualitatively evaluating a surface finish, developed by Harry K. Herschman, of the Metallurgy Division of the U.S. National Bureau of Standards, appears promising.

The method, which is described in the January *Journal of Research* (RP 1625), is based on the use of a nearly transparent plastic replica of the surface. The accuracy of reproduction of minute surface characteristics in such a film is attested by the fact that similar replicas are used in the study of metal microstructures at high magnifications with the electron microscope. In the present case, the film is formed by applying a suitable solvent to the metal surface, following which a strip of preformed plastic film is pressed on. The solvent softens the side of the film adjacent to the surface being examined, and thus permits it to flow and conform under pressure to the surface irregularities. The replica thus formed dries in about one minute and is then stripped readily from the surface.

In evaluating the finish, a narrow beam of light is passed transversely through the moving replica, and thence on to a photoelectric cell. Variations in the geometric characteristics of the replica that correspond to the serrations in the metal surface control the intensity of the light transmitted through the film and reaching the photocell at any instant. The variation in light intensities produces a fluctuating voltage in the photo-cell circuit, which can be measured with an electronic voltmeter. The voltage readings can be translated into "roughness" evaluations by calibrating the voltmeter in terms of profile measurements of the surfaces, determined by microscopical means.

U.S. Lead Industry in 1944

Reduction of Stocks

THE outstanding feature of the lead industry in 1944 was the decrease in new supplies which failed to balance a high level of consumption, states the Bureau of Mines. Production from mines in the U.S., the principal source of new supply, continued to decline, owing to a severe shortage of manpower. Imports of refined lead were lower, consumption was maintained at a high level, and Government stocks of refined lead were steadily reduced to a point considered below the margin of safety. At the end of the year, a sweeping revision of the existing general preference Order M-38 was announced by the War Production Board, to restrict further consumption and thus to ease a situation which had become critical. The ceiling price for lead remained unchanged throughout 1944, and payments under the premium-price plan continued to be made by the Metals Reserve Company.

Mine Production

Mine production of 416,861 tons of recoverable lead (including that made into lead pigments) in the United States and Alaska in 1944 was 8 per cent. below the 453,313 tons produced in 1943. The Southeastern Missouri district continued to be the largest lead-producing area, supplying 41 per cent. of the total domestic output. The Western States accounted for 50 per cent. of the total, Idaho being the largest producer of the group.

Producers' stocks of refined lead declined by 54 per cent., and inventories of antimonial lead (in terms of lead content) at refineries decreased by 8 per cent. The greatest drop, however, was in Government-owned stocks of refined lead which decreased 48 per cent. Consumers' stocks also showed a net drop of 22 per cent.

The calculated supply of refined primary lead made available for shipment to consumers was 775,095 tons, less than 1 per cent. under the comparable 1943 total. The chief consumers were manufacturers of red lead and litharge with 157,080 (124,715) tons, cable-covering absorbed 110,417 (117,802) tons, while 83,067 (65,320) tons went into tetraethyl lead and 54,333 (36,809) into white lead.

Imports continued at a high rate—virtually the same as in 1943—but considerably below the record total in 1942. Of the pig lead imported, 75 per cent. came from Mexico, and 24 per cent. from Peru. Receipts of lead in ore and matte, which constituted 30 per cent. of the total in all forms, were 35 per cent. higher than in 1943, largely owing to a marked increase in imports from Australia, Newfoundland and Peru, which more than offset a substantial decline from Africa and Bolivia. Imports of lead in base bullion dropped to only a few tons owing to a complete absence of receipts from Australia. Four countries furnished 93 per cent. of the total lead in all forms imported into the United States in 1944. Mexico accounted for 53 per cent., Peru 20 per cent., Newfoundland 10 per cent., and Australia 10 per cent., compared with 68, 7, 4, and 10 per cent. respectively, for a total of 89 per cent. in 1943. Exports of pig lead in 1944 continued to be relatively small; of the 15,523 tons exported, 92 per cent. went to the U.S.S.R.

The Department of Metallurgy of Manchester University has received a grant of £375 from the British Non-Ferrous Metals Association for the purpose of research.

The present issue of the Bulletin of the British Cast Iron Research Association begins a new volume—No. 8. With the present number, publication six times yearly will be resumed, as before the war.

The Aluminium Development Association, 63 Temple Row, Birmingham, 2, has published a 16-page brochure on "Aluminium Alloy Extruded Sections: Notes on Design and Manufacturing Tolerances." It provides design staffs with the necessary information on the design of extruded sections to make for maximum efficiency. The same Association has also issued a Bulletin on the "Spinning and Panel-beating of Aluminium Alloys." (Price 1s.)

From July 31 the following Liaison Offices of the Iron and Steel Control ceased to operate: 3 Exchange Place, Middlesbrough; 15 Ranmore Park Road, Sheffield, 10; 116 Blythswood Street, Glasgow, C.2; 263 Hagley Road, Birmingham, 16. After that date all matters hitherto dealt with by the Liaison Officers should be referred to the appropriate Director at the Headquarters of the Iron and Steel Control, Ashorne Hill, near Leamington Spa, Warwickshire. Other sections of the Control, operating from the above offices, will continue to function for the time being.

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A CHEMIST'S BOOKSHELF

WHITHER PLASTICS? THE POSSIBLE USES OF PLASTICS IN INDUSTRY, SCIENCE AND ART. By Ronald Fleck, M.Sc., F.R.I.C. London: English Universities Press. Pp. xxxiii +99. 15s.

The author, whose earlier work *Plastics—Scientific and Technological*, has provided the ever-increasing number of people professionally interested in the plastics industry with an excellent reference book (*see* THE CHEMICAL AGE, 1944, *50*, p. 253), has now sought to place the industry in its proper perspective, a task which, in view of the spate of comment and often ill-informed enthusiasm, deserves to be highly commended. The exuberance of certain sections of the lay press, both here and in the United States, has forecast a kind of plastic age, a development which, if not corrected by a more sober expert opinion, might do untold harm to this comparatively new industry. Mr. Fleck's work delineates the function of plastics, side by side with metals and other materials, and attempts to show how plastics can best fulfil their functions in various industries. Of special interest is the chapter dealing with the application of plastics in the chemical industry, while other chapters deal with the electrical, paint, rubber, textile, and automotive industries. Plastics in surgery and medicine, and their application to art, round the book off. The criticism we made when reviewing Dr. Fleck's first work on plastics, *viz.*, the high price in spite of the inclusion of pages of advertisements, still holds good. Several illustrations and a chart are a valuable feature, although the lack of a reference index should not go unnoticed.

COLLOIDS, THEIR PROPERTIES AND APPLICATIONS. By A. G. Ward, M.A. London and Glasgow: Blackie. 1945. Pp. 133; Figs. 34. 5s.

This little book, an addition to Blackie's "Technique" series, consists of three parts dealing in succession with "the nature of the colloidal state," "the colloidal systems," and "colloids in industry and in living matter." The headings of Part II and Part III are self-explanatory but the largest chapter of Part I deals with atomic structure of matter, the nature of intra- and inter-molecular bonds, etc.

It is not an easy task to review the science and industry of colloids in a book of these modest dimensions, and the author did not make it any easier when he based his treatment on properties of atoms and molecules and of atomic and molecular forces. In the present state of our knowledge these properties can be used to account for only a very modest fraction of colloidal phenomena. In Part I of Ward's book we are told about hydrogen bonds, free rotation about homopolar bonds, etc. In Part II it is mentioned that troublesome dusts (aerosols) are formed in rock drilling and similar operations. What is done to counteract their effects? Do we utilise the free rotation, the hydrogen bond or any related property? No; water streams are used to carry away the dust (p. 81). Now, carrying away dust by water is every bit as scientific as is the hydrogen bond; only the sciences involved are different—hydrodynamics, capillarity, etc., instead of organic chemistry. These sciences, which are of primary importance in the majority of colloidal phenomena, especially those used in industry, are ignored in the book.

The unjustified prominence given in the book to molecular structure may be illustrated also by two minor examples. On p. 16 we find that "the molecules of hydrogen, which each contain two hydrogen atoms linked by a homopolar bond, have an average velocity at 0°C. of about 1650 metres per second." Does the velocity depend on the nature of bond? On p. 19 toluene is listed among substances "where no dipoles are present." Toluene, of course, possesses a permanent dipole moment. Such a slip may easily happen to anybody, but it seems probable that in this instance it is not due to just a momentary lack of care: the behaviour of toluene is surely reminiscent of that of benzene more than of that of alcohol.

It would be unfair to blame the author for adhering to the fashion which is now prevalent, and the above criticism is levelled against the fashion rather than against one of its followers who has written an interesting and informative little volume. The exterior is quite pleasing, although the book is produced "in complete conformity with the authorised economy standards."

SEMI-MICRO QUANTITATIVE ORGANIC ANALYSIS. By R. Belcher and A. L. Godbert. London: Longmans, Green. Pp. viii +168. 10s. 6d.

This book is the first of a series of *Textbooks on Modern Analytical Chemistry*, and it fills very successfully a gap of long standing in British chemical literature. Semi-micro methods are rapidly becoming surely established, not merely as a half-hearted attempt at microchemical analysis, but in their own right. The present book aims at presenting a complete course in the methods as applied to the determination both of the usual elements—carbon, hydrogen, nitrogen, sulphur, halogens, phosphorus, and arsenic—and of the commoner groups, those chosen being the carboxyl, methoxyl, and acetyl groups. In addition to this, the cognate determinations of moisture, ash, and metals in organic compounds are described, while such essential physico-chemical measurements as density, melting and boiling points, and molecular-weight determination by a

variety of methods, are adequately dealt with.

Paradoxically enough at first sight, the present reviewer would pick out for special praise none of the above, but rather the chapter dealing with the balance and methods of weighing, and the two appendices—which might well find their proper place in future editions as true chapters—describing the purification of small amounts of material, and the preparation and standardisation of volumetric solutions. The chapter on weighing gives an account of the use of the ordinary analytical balance as a centigram balance. It should not only be clear to any reader, but should also form an excellent introduction to the more delicate but similar technique associated with the microchemical balance proper. All the necessary related topics, such as calibration of weights, use of counterpoises, and care of the balance, are excellently covered.

The appendices present to the student of semi-micro organic analysis information which is often omitted in teaching the methods, as not being termed organic analysis; but information which is nevertheless of prime importance, since what profit is it to the analyst to take the greatest care in carrying out his determinations, if his material is impure, or his standards are suspect?

This book is valuable. With the present trends in analytical chemistry, it is essential. And it is no minor point to note that it is well produced and strongly and pleasantly bound, with nothing about it other than the War Economy mark on the preliminary page to suggest that it is essentially a war-time production. Authors and publishers alike are to be congratulated on the union which has given rise to this offspring.

Natural Gas in the U.S.S.R.

Use of Prolific Resources

THE utilisation of natural gas on a large scale in the Soviet Union began during the war, when a gas main connecting the city of Saratov on the Volga with the Elshanka gas deposits was constructed in 1942. Up to the beginning of December, 1944, 67 industrial units in Saratov had converted their plants to the use of natural gas, thereby effecting a saving of 400,000 tons of coal and of 70,000 tons of crude oil.

The second major step in the use of the large occurrences of natural gas in the U.S.S.R. was the laying of a gas main between the prolific Bugurusian deposits, located near a tributary of the Volga, and the city of Kuibishev. Put into operation in September, 1939, it now provides some 140 industrial units with fuel, thereby effecting a saving of 300,000 tons of coal. Pipes used in the construction of this main were of asbesos cement, instead of metal, but they proved to be satisfactory even under high pressure. Demand has increased appreciably, making the construction of a second main necessary.

The discovery of large deposits of natural gas in the Volga Valley late last year attracted the Government's attention and authorisation was given to lay a pipeline from Saratov to Moscow which, it is hoped, will be completed by the end of this year.

Natural gas reserves in the Carpathian Mountains, estimated by the Ukrainian Geological Committee to aggregate 100 milliard cubic metres, will be tapped to provide gas for Kiev, the capital of the Ukrainian Soviet Republic. The first reserve to be thus used will be at Dashava in the Carpathian foothills, from which a 325-mile pipeline is to be constructed. Surveying work for further pipeline is now in progress around the cities of Stalingrad, Novorossiisk, Melitopol, and Gorki.

New Use for Mercury

U.S. Dry-Cell Battery

THE *Wall Street Journal* recently published an article dealing with a new mercury dry-cell battery, the further development of which might exercise an important influence on the demand for mercury. Such demand, as a result, might increase by about half, thus reviving the mercury market, which has shrunk owing to the displacement of the metal from its use in the tinfoiling of mirrors and because of the substitution of the amalgation process for the production of rare metals by the cyanide process.

The new battery is an invention of Mr. Samuel Rubens, of New Rochelle, N.Y., and the licence rights are owned by P. R. Mallory & Co., of Indianapolis, which collaborates with the American Army Signal Corps. The latter makes use of the battery mainly for the lighting of minesweepers, cine equipment, etc. The advantage of the Rubens battery, which is based on mercuric oxide, lies in its durability. It is claimed to last five times as long as the usual dry-cell battery of the same size. Because the new battery, unlike the standard pattern, needs no porous surface, and is of smaller size, it can be built into closed machine parts. The battery is reported to have proved suitable for the high temperatures and humidity of the Pacific area.

Plans for the maintenance of Bolivia's tin industry after the war as a safeguard against the future stoppage of supplies from the Far East are reported to be under study in Washington.

Personal Notes

MR. A. H. N. WELLS has been appointed a director of A. Boake, Roberts & Co., in succession to Dr. Durrans.

MR. G. A. JONES, of University College, Cardiff, has been elected to a Meyricke Graduate Scholarship for Chemistry at Jesus College, Oxford.

DR. W. E. FOSTER and DR. G. A. SWAN have been selected as recipients of I.C.I. Research Scholarships tenable at Durham University for three years at £600 a year.

DR. N. WRIGHT, Director of the Hannah Research Institute, has been loaned to the Glasgow and West of Scotland College of Agriculture as interim director of research to succeed Dr. McArthur.

SIR JOHN NICHOLSON, for reasons of health, has relinquished the position of deputy-chairman of I.C.I., Ltd., and retired from the board of the company. SIR FREDERICK BAIN and DR. W. H. COATES have been elected deputy-chairmen.

The delegation from The Drug Houses of Australia, which is at present visiting this country, is under the direction of MR. G. E. MADDISON (director of Drug Houses of Australia and Elliotts & Australian Drug Pty., Ltd.). The other members are MR. L. P. CORVISY (director of Elliotts & Australian Pty., Ltd.), MR. F. C. BENNETT (Development Section), MR. GORDON MORE (Felton Grimwade & Duerdins Pty., Ltd., Melbourne), and MR. P. A. BERRY (A. M. Bickford & Sons, Ltd., Adelaide).

Among candidates who retained their seats in the General Election are SIR ANDREW DUNCAN, formerly director of I.C.I. (Nat., City), SIR STANLEY HOLMES (Lib. Nat., Harwich), managing director of Beechams Pills and chairman of Beecham-Maclean Holdings, and MR. E. L. GRANVILLE (L., Eye, Suffolk), a director of Eucryl and Veno Drug. SIR EDWARD SALT (C., Yardley), chairman of the Parliamentary and Scientific Commitee, lost his seat, so did MR. NIGEL COLMAN, a director of J. & J. Colman, at Brixton (C.), as well as MR. T. LEVY (C., Elland, West Riding), a director of British Celanese. MR. J. STEWART COOK, formerly secretary of the London section of the B.A.C., contested Henley without success for the Labour Party, while MR. S. H. MARSHALL (C.), chairman of Tonicity Laboratories, was successful at Sutton and Cheam. MR. H. N. LINSTEAD, secretary of the Pharmaceutical Society, held his seat at Putney (C.), and MR. CLEMENT DAVIES, K.C., a director of Lever and Unilever, was again returned for Montgomery (L.). MR. J. LEWIS, a rubber technologist, was a winner at Bolton (Lab.), while MR. R. CLITHEROW, a pharmacist, was returned at Edge Hill (Lab.).

DR. C. F. GOODEVE, O.B.E., F.R.S., director-designate of the new British Iron and Steel Research Institute, was born at Winnipeg, and is an M.Sc. of the University of Manitoba, as well as a D.Sc. of University College, London, where, before the war, he was Reader in Physical Chemistry. He is president of the British Rheologists' Club. During the war he served, with the rank of Commander, R.N.V.R., as Assistant Controller of Research and Development, Admiralty, and took a leading part in the research which led to the defeat of the magnetic mine, the U-boat, and other enemy weapons.

DR. S. WERNICK, who was elected president of the Electrodepositors' Technical Society at its recent annual meeting, is a graduate of London University, having received his Doctorate for research in electrochemistry. Having served for many years as honorary secretary and editor of the Society, he is a well-known figure in the electrodeposition world. He has been specialised particularly in processes connected with the protection of ferrous materials, light alloys, bright plating and electrolytic polishing. His researches have resulted in many notable contributions to the literature. At present consultant and adviser to a number of important companies, he has latterly been engaged particularly in plant design. He is also a member of various Government and National Research committees.

Obituary

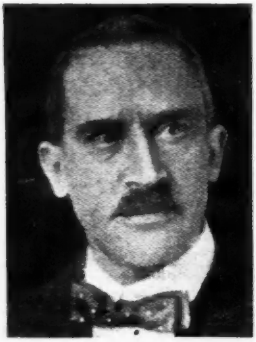
DR. CLARENCE SMITH, who died on June 28 at Staplefield, Sussex, aged 71, had been editor of the *Journal of the Chemical Society* since 1921.

DR. WILLIAM HERBERT COOK, who died on July 24, was a chemist on the staff of I.C.I. Central Laboratory, Widnes. He was in America at the outbreak of the war, but returned to this country in 1940 and engaged in research work, latterly in connection with Gammexane.

MR. IDRIS CHEER ROBERTS, M.Sc., A.R.I.C., who died at Redcar, Yorks, on July 21, aged 50, had been with I.C.I. for 16 years, having joined the company in 1929, working as a laboratory assistant in the fertiliser and synthetics division, and later on as library assistant. Previously, he had seen war service with the Special Brigade, R.E. (1915-17) and the Welch Regt. (1917-18); and in 1924-28 he was employed at Colwyn Bay Secondary School.

SIR CHRISTOPHER CLAYTON, C.B.E., Ph.D., F.R.I.C., of Kilry Lodge, Alyth, Perthshire, who died on July 28, aged 76, was for many years a leading figure in the British and especially the Lancashire, chemical industry. Educated at Harrow,

Liverpool University, and Heidelberg, he entered the chemical industry in 1896 in the United Alkali laboratory, rising in 11 years to a seat on the board of that company, and becoming a director of I.C.I. when United Alkali was merged therein in 1927. He was also a director of the Power Gas Corporation, and chairman of the Liverpool Gas Company, where he succeeded Sir Henry Wade Deacon in 1932. He was Conservative M.P. for Widnes in 1922-29, and for the Wirral Division of Cheshire in 1931-35, and he received the honour of knighthood in 1933 (our portrait of him dates from that occasion). He retired from his directorships, and from public life generally, just four years ago. His Fellowship of the Royal Institute of Chemistry dated from 1902 (Associate in 1890) and he served on the Council of the Institute in 1926-33, being president for the last three years, and Censor in 1930-38. He was an active member of many official bodies connected with the chemical industry, including the Advisory Council of the D.S.I.R., and the Fuel Research Board. In the last war he served on the Trench Warfare Committee. He was for many years on the Council of the Association of British Chemical Manufacturers; elected chairman for 1928-30, he served as president of the Association in 1933-35.



Sir Christopher Clayton.

General News——From Week to Week

Another Users' Memorandum (No. U.12) has been issued by the Services Rubber Investigations, dealing with "Creep Phenomena —Natural and Synthetic Rubbers (Part I).

The Trading with the Enemy (Specified Persons) (No. 8) Order, 1945 (S. R. & O., 1945, No. 830) is a consolidating Order, covering all similar orders to date and revoking Nos. 1-7 Orders, 1945.

Colours for autumn and winter suggested by the British Colour Council include tones typical of the "fall of the year," such as copper leaf, vintage wine, and chestnut brown. These millinery colours harmonise perfectly with the town and country colours selected for other sections of the women's wear trade.

The Treasury has made the Additional Import Duties (No. 4) Order, 1945, dealing with certain goods which were subject to the Anglo-German Trade Agreement of 1933. That agreement became void when war broke out and the Order restores the duties under the Import Duties Act, 1932, in force before the agreement was made, to the rates which would have been in force if the Anglo-German Agreement had not been made. The goods affected by the changes of duty, which are enumerated in the First Schedule to the Order, include certain chemicals.

Sodium chlorate is now available, in limited supply, for weed-killing purposes. This announcement is made by the Staveley Coal & Iron Co., Ltd., Chesterfield, who are the only makers of sodium chlorate in the country.

The following items should be deleted from the list of commodities subject to M.E.S.C. procedure: analytical balances, electrical or turbine-driven laboratory centrifuges, value from £15; vacuum pumps, one micron or higher vacuum; and ammonium phosphate.

The following DTD Specifications have been issued by the M.A.P.: Cadmium Plating (Amendment List No. 2), Soft Aluminium Alloy Sheets and Coils (Amendment List No. 2), and Aluminium-coated Aluminium Alloy Sheets and Coils (Amendment List No. 3).

Boots Pure Drug Company are looking forward to having new research buildings suitable for the important work they will be carrying out under their new Director of Research, Sir Jack Drummond, F.R.S. Lord Trent made this announcement in his speech as chairman at the annual meeting last week, when he revealed that the company's research department had suffered severe war damage, losing its library, among other buildings.

The Manchester Group of the Society of Leather Trades' Chemists announces that meetings for the 1945-46 session have been arranged to be held at the Engineers' Club, Manchester, on the following dates: October 13 and November 17, 1945; February 16 and April 6, 1946.

The I.C.I. war-time plant at St. Boswells, which was managed by Mr. J. A. Millar from the Ardeer staff, and gave employment to some 1300 workers drawn from all over the Scottish Border country, has now been closed. In 2½ years 25 million incendiary bombs were made there. It is hoped that textile or other alternative industrial production may be started, in view of the great dearth of factories in the area.

"The Stoker's Manual," issued at 6d. by H.M. Stationery Office for the Ministry of Fuel and Power, is a useful little booklet written specially for the boiler stoker. It is an invaluable guide to the methods of obtaining the best service from industrial boilers of all types, and contains some useful notes on the principles of combustion in general. The extremely clear illustrations are not the least helpful part of this well-produced manual.

Foreign News

The U.S. War Production Board has removed import controls from amber block mica and all graphite, except amorphous lump graphite with a graphite carbon content of 90 per cent. and over.

An American drug mission is encouraging the development and planting of pyrethrum in Mexico and Central America through technical advice and the distribution of seeds obtained in British East Africa.

Two synthetic fuel plants form part of the building programme of the Soviet Commissariat for Industrial Construction. One of these will cover an area of 750 acres and produce 500,000 tons of oil annually.

With less than 35 per cent. of the known zinc resources still unmined in the U.S., the Geological Survey is intensively investigating possible new sources and has discovered many prospects for both zinc and lead in the Powell River area of Tennesee.

Development of exceptionally high-grade iron deposits on Cockatoo Island, Yampi Sound, in the extreme north-west of Western Australia, is contemplated by the Australian Iron and Steel Co. It is estimated that there is nearly 8 million tons of ore at Yampi.

The "Lenin" soda works on the Donets, described as one of the largest in Europe, has now been restored to working order. The production of caustic soda was resumed a short while ago, and the full pre-war output is to be reached in the first half of 1946.

Penicillin is now being sent from the United States to Switzerland in slightly larger quantities. The distribution is subject to State control, but chemists will be supplied as soon as stocks permit its sale against medical prescription.

"Once science is harnessed to our aid, India will again be that land of milk and honey which attracted visitors to this country in the past," declared Sir S. S. Bhatnagar at the first meeting of the Technical Panel of Indian Scientists.

In the Darling Ranges, 30 miles from Perth, the State Government of Western Australia is experimenting with the production of charcoal iron and by-products. It is hoped to use poorer timber in the barges for high-grade charcoal iron which both India and the U.S.A. are interested in buying.

The china factories of Limoges, which had been closed since June, 1944, resumed limited production early this year, when small shipments of coal were received. It is claimed that from June, 1940, to the liberation, deliveries to Germany did not amount to more than 1 per cent. of the total Limoges production.

Vinyl chloride capes and jackets are being made by mass-production methods in several Soviet plants. The material is one-tenth of an inch thick and is joined together by pressure at a temperature of 250° C. as stitching was found impracticable. Vinyl chloride footwear is stated to be produced in many Russian factories.

Two subsidiaries of the U.S. Steel Corporation have adopted plans to increase their cold reduced tinplate production facilities by about 285,000 tons annually to provide for post-war demands. The annual total capacity of all of the cold reduced tinplate plants in U.S.A. at the end of last year was 3,850,000 net tons, as reported by the Iron and Steel Institute.

The ANIC petroleum refinery at Bari is being restored, but the company's Leghorn refinery, as well as the Socony Vacuum's plant at Naples, has been too heavily damaged. The refineries at La Spezia, Fiume, Trieste and the large AGIP plant at Porto Marghera are reported severely damaged. There is a small refinery in Rome capable of refining 100 tons of crude oil daily.

Applications for the construction of one petroleum refinery each at Tripoli, 40 miles north-east of Beirut, made to the Lebanese Government by Standard Oil, of New Jersey, and Socony Vacuum Oil Co., have been granted. The agreement provides for a 70 years' concession, and it is believed that the projected oil refineries will be able to deal with 50 per cent. of the raw oil brought to Tripoli from Iraq.

The pyrethrum crop in Kenya reached the record figure of 6547 tons last year, compared with a previous highest figure of 5869 tons in 1940. There was a slight decline in the next two years, and a considerable drop to 4107 tons in 1943. The industry has embarked upon a scientific research programme to cost £2000 p.a. for the next five years, contributed half by the growers and the balance by the Government of Kenya. A private company is erecting a pyrethrum extract plant in Nairobi at the request of the M.O.S. to cater mainly for military needs, and it is expected to be working in August.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

B. SELIER & SONS, LTD., Croydon, varnish manufacturers, etc. (M., 4/8/45.) July 5, £5000 1st debenture, to B. C. J. Selier; general charge.

SILICA GEL, LTD., London, W.C. (M., 4/8/45.) July 10, assignment, securing to Midland Bank, Ltd., all moneys due or to become due to the Bank; charged on contract moneys. *£1776. November 29, 1944.

Satisfaction

CELLACTITE & BRITISH URALITE, LTD., Higham (Kent). (M.S., 4/8/45.) Satisfaction June 30, £40,000, registered August 28, 1928.

Declaration of Solvency Filed

JOSHUA REA & SONS, LTD., Liverpool, paint and varnish manufacturers. (D.S.F., 4/8/45.) July 5.

Company News

The Gas Light and Coke Company is paying an interim ordinary dividend of 2½ per cent. (same).

Van den Berghs and Jurgens, Ltd. report a net profit, for the year 1944, of £876,218 (£799,824). The ordinary dividend is 10 per cent., tax free (8 per cent.)

De La Rue (Thomas) and Co., Ltd., report a trading profit, for the year to March 31, of £486,062 (£275,372). Net profit is £478,683 (£311,629). The final dividend of 30 per cent. (same) makes again a total distribution of 40 per cent.

Birmid Industries, Ltd., have made a net profit, for the year to October 31, of £122,437 (£120,354). The dividend is again 10 per cent., but the bonus has been increased from 7½ per cent. to 10 per cent.

Sangers, Ltd., report a net profit, for 11 months to March 31, of £224,590 (previous year £272,779). A final ordinary dividend of 15 per cent., making 25 per cent. for the 11 months (25 per cent. for last year), has been declared.

Chemical and Allied Stocks and Shares

FOLLOWING the Election result, prices in stock markets declined sharply, mainly owing to a precautionary marking down by dealers. Selling, however, proved to be less heavy than expected, and subsequently the tendency became steadier, but with little buying in evidence the downward trend was resumed, home railway stocks, colliery shares, iron and steels, electricity supply shares and securities of insurance companies recording further declines. Markets are adopting a waiting attitude pending the King's speech and the opening of Parliament on August 15. British Funds tended to rally, reflecting the belief that the new Government will have to continue the cheap money policy, and that gilt-edged stocks are likely to benefit from reinvestment of part of the money arising from selling of industrial shares.

As was to be expected, shares of chemical and kindred companies moved back sharply in accordance with the general trend. Imperial Chemical were 37s. 9d. compared with 40s. 4½d. a week ago, Turner & Newall 78s. 9d. (82s. 6d.), Borax Consolidated deferred 42s. (43s. 6d.), and Lever & Unilever 46s. 3d. (50s.). The prevailing view is that dividend prospects of individual companies may in many cases turn on Government policy, particularly in regard to E.P.T. The assumption, however, is that there seem reasonable possibilities that Imperial Chemical will maintain the 8 per cent. dividend basis which has ruled for some years; the yield at the current price now works out at over 4½ per cent. Hopes of a higher payment on Borax Consolidated deferred turn mainly on the possibility that in view of the company's U.S. interests it may benefit considerably from the abolition of "double taxation." There is also continued talk of a higher payment from Lever and Unilever, although this will depend on the position of Lever N.V., there being a dividend guarantee agreement between the English and Dutch companies.

Compared with a week ago, the units of the Distillers Co. declined from 118s. 6d. to 112s. 6d. British Plaster Board have fallen from 39s. to 36s. 3d., United Molasses from 43s. to 41s. 9d., Courtaulds from 55s. 6d. to

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52s. 6d., and British Celanese from 33s. 6d. to 30s. 9d. Textiles generally reacted rather sharply because it is recognised that in many cases prospects of higher dividends will depend largely on the future reduction or abolition of E.P.T. and the new Government's attitude to this has yet to be defined. Fine Spinners, 25s. 9d. a week ago, were 22s. 6d. Bradford Dyers fell from 27s. 6d. to 25s., and Calico Printers from 19s. 6d. to 18s., although the market remains hopeful that the results of the last-named will show an improvement in earnings. There was a sharp decline to 83s. 9d. in British Oxygen. British Aluminium moved down to 42s. 6d., Birmid Industries to 93s. 9d., and Wall Paper Manufacturers deferred to 40s. After an earlier decline, however, Barry & Staines firmed up to 54s. Nairn and Greenwich were little changed at 77s. and Triplex Glass rallied to 41s. 3d. Reflecting the prevailing trend, General Refractories receded to 16s. 1½d., although it is pointed out that the big schemes for post-war development of the iron and steel industry should expand demand for the company's products. Amalgamated Metal went back to 19s., and were unaffected by the possibility of early re-opening of the London Metal Exchange. Elsewhere, B. Laporte were maintained around 87s. Monsanto Chemicals 5½ per cent. preference kept at 23s., but Greeff-Chemicals Holdings 5s. shares eased to 9s. and Boots Drug declined to 54s. Elsewhere, De La Rue, after a rally on further consideration of the financial results, went back to £10½. Dunlop Rubber were 48s. as compared with 51s. 3d. a week ago. Imperial Smelting declined 7½d. to 15s. British Drug Houses fell back to 36s. 9d.

Anglo-Iranian declined from 5⅝ to 5 7/16 and Shell from 84s 4½d. to 81s. 3d., but movements in oil shares generally were relatively small as it is assumed that the outlook for the industry may not be much affected by domestic political developments.

British Chemical Prices

Market Reports

THE past week has witnessed fairly steady trading conditions in the London general chemicals market, despite the holiday period, and a certain amount of fresh inquiry has been reported both for home and export account. Deliveries against contracts have been satisfactory and the tone of the market remains firm. In the soda products section, there has been a good call for supplies of chlorate of soda, bichromate of soda, and nitrate of soda. Acetate of soda, Glauber salt, and salt cake are steady, and hyposulphite of soda is a brisk market. Among the potash products, permanganate of potash is firm and in good request, while elsewhere in this section supplies are none too plentiful. Among the miscellaneous chemicals home producers of formaldehyde report a steady demand, while makers of peroxide of hydrogen have good order books. There has been little change in the position of alum lump, which is moving into consumption in substantial quantities. Pure glycerine, as well as the crude material, is in brisk demand, while supplies of sulphur are being steadily absorbed. A moderate volume of inquiry is reported for acetone. In the coal-tar products section, a fair export trade is passing in crude tar and pitch. Crude carbolic acid and cresylic acid are in good demand, and the xylols and naphthas are being called for in fair quantities. Naphthalene is a brisk market.

MANCHESTER.—Movements of textile bleaching, dyeing and finishing, and other leading industrial chemical products on the Manchester market continue to be adversely affected by the annual holidays in the area, but, due allowance being made for this seasonal influence, the past week has been fairly active, and new inquiry as well as actual fresh bookings have again been on a moderate scale. The alkalis generally, as well as the potash, ammonia, and magnesia compounds, are being taken up in fair quantities, and there is a steady call for the heavy acids. Most classes of fertilisers are in quiet seasonal demand. The light and heavy tar products are mostly finding a good outlet among home users and a certain amount of export business is being done.

GLASGOW.—In the Scottish heavy chemical trade business has, in most instances, now resumed after the annual holidays. Export business remains unchanged. There are no changes in prices to report.

Price Changes

Chrometan.—Crystals, 5⅝d. per lb.

Chromic Acid.—1s. 7d. per lb., less 2½ per cent., d/d U.K.

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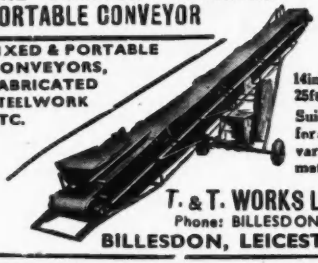
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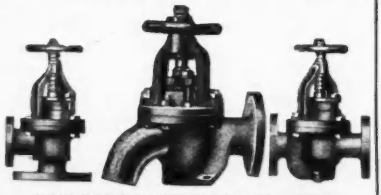
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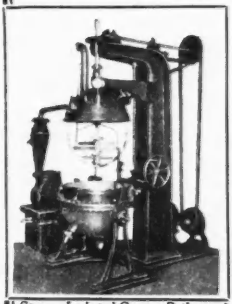

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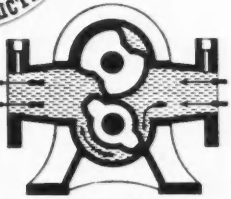

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